and the Newer Tertiaries, or crags, in which a large proportion of the forms belong to species still living in the seas of some portion of the globe. Mr. Searles Wood naturally chose the latter group for his study, and Mr. Edwards the former.

Upon the great task he had set before himself Mr. Searles Wood appears to have entered with characteristic energy, and in 1847 the Palæontographical Society was able to issue its first volume, which was entirely from the pen of Mr. Wood, and consisted of a description of the Crag Univalves, illustrated by twenty-one plates. In the years 1850, 1853, and 1855 Mr. Searles Wood was able to publish the parts of his descriptions of the Crag Bivalves, illustrated by thirty-one plates.

It soon became evident however that Mr. Edwards had taken upon his shoulders a lion's share of the work, and his friend Mr. Wood, having completed his own task, had to come to the aid of his fellow-student of the Tertiary fauna. It was then agreed that Edwards should complete his description of the Older Tertiary Univalves and that Wood should take up the description of the Bivalves. Between the years 1859 and 1877 Mr. Searles Wood published his descriptions of the Eocene Bivalves, illustrated by twenty-seven plates.

Additional discoveries of fossils having afforded Mr. Wood fresh materials, a supplement to the "Crag Mollusca" was published by him between the years 1871 and 1873. This work was illustrated by twelve plates, and included a very valuable memoir on the strata from which the fossils were obtained, written by his son, Mr. Searles V. Wood, jun., and Mr. Harmer of Norwich, who have both done so much good work in unravelling the complicated problems connected with the geology of East Anglia.

Nor did the zeal of Mr. Wood allow him to rest even here; for in 1877, in spite of his advanced age, we find him commencing a supplement to his own and Edwards's work on the Eocene mollusca.

In the year 1860 the Geological Society recognised the great services rendered to science by Mr. Searles Wood by presenting him with the blue-riband of geology, the Wollaston Medal. Prof. Phillips, who, as president of the year, handed the medal to Mr. Searles Wood, spoke in terms of well-merited praise of the important works which were the result of his patient, persevering, and successful labours.

Mr. Searles Wood and his friend Mr. Edwards were remarkable examples of a type of scientific man which, happily for us, is far more common in this country than in any other. They were both engaged in the legal profession, but found time in their leisure hours to accomplish most excellent and useful scientific work. In the volumes of the Palæontographical Society the work of amateurs like Searles Wood, Edwards, and Davidson appears side by side with that of Richard Owen, Edward Forbes, and John Phillips. The subscriptions of the members cover the cost of engraving and printing, but all other charges are defrayed by the authors, who expect and receive no kind of payment for their important labours.

The valuable collection of Tertiary fossils made by Edwards and Searles Wood have fortunately been secured by the authorities of the British Museum for our National Collection. They will in the New Natural History Museum at South Kensington be more accessible for study than at Bloomsbury, and as they contain great numbers of type specimens, will be invaluable for purposes of reference to both British and foreign palæontologists.

Mr. Searles Wood, as Treasurer of the Palæontographical Society, took the heartiest interest in its success, to which his own labours have to such a great extent contributed. Those who had the pleasure of a personal acquaintance with Mr. Searles Wood will ever remember the kindly and genial manners by which he was distinguished. J. W. J.

NOTES

THE following is the list of officers and council of the Royal Society nominated for the year ensuing. The election will take place as usual on St. Andrew's Day, November 30:—President — William Spottiswoode, M.A., D.C.L., LL.D.; Treasurer—John Evans, D.C.L., LL.D.; Secretaries—Prof. George Gabriel Stokes, M.A., D.C.L., LL.D.; Prof. Thomas Henry Huxley, LL.D.; Foreign Secretary—Prof. Alexander William Williamson, Ph.D.; other members of the Council—William Henry Barlow, Pres. Inst. C.E.; Rev. Prof. Thomas George Bonney, M.A.; George Busk, F.L.S.; Right Hon. Sir Richard Assheton Cross; Edwin Dunkin, V.P.R.A.S.; Alexander John Ellis, B.A.; Thomas Archer Hirst, Ph.D; William Huggins, D.C.L., LL.D.; Prof. John Marshall, F.R.C.S.; Prof. Daniel Oliver, F.L.S.; Prof. Alfred Newton, M.A., Pres. C.P.S.; Prof. William Odling, M.B., V.P.C.S.; Henry Tibbats Stainton, F.G.S.; Sir James Paget, D.C.L.; William Henry Perkin, Sec. C.S.; Lieut.-General Richard Strachey, R.E., C.S.I.

IT is proposed to erect a monument to Spallanzani in Scandiano, where the distinguished naturalist was born in 1729 A committee for the promotion of the scheme has been formed there, and at Reggio and Modena. A monument in marble is contemplated, more or less splendid according to the sum provided, and it will be inaugurated on August 21, 1885 (if circumstances do not allow of an earlier inauguration). The committee meanwhile propose (if practicable) to publish a new and accurate edition of the writings of Spallanzani, including some which have not hitherto appeared. Contributions are hoped for not only from Italians, but from foreigners generally among whom the work and principles of Spallanzani are honoured.

M. LEON HUMBLOT, a well-known *naturaliste-voyageur*, has just returned to Paris from Madagascar with large and valuable collections. Amongst the living specimens (destined for the Menagerie of the Jardin des Plantes) are two examples of the aye-aye (*Chiromys madagascariensis*), which, M. Humblot maintains, it is now more difficult to procure in Madagascar than in Europe; a pair of the rare carnivore *Cryptoprocta ferox*, and specimens of several of the smaller lemuroids. M. Humblot has also brought a valuable series of mammals and birds in skin and a large collection of orchids.

NO naturalist who visits Florence should omit to inspect the series of Italian vertebrates which has been brought together in the Reale Istituto degli Studii superiori, by the exertions of Prof. H. H. Giglioli. The collection embraces a series of authenticated specimens of mammals, birds, reptiles, batrachians, and fishes from every part of Italy and the adjoining districts which belong essentially to the same fauna, arranged in systematic order, and is far more complete than any other Italian collection of the same sort. Prof. Giglioli is preparing a catalogue of this collection as a basis for a new "Fauna Italica."

ON the 1st inst. a very fine Naval and Marine Engineering Exhibition was opened in the Corporation Galleries, Glasgow, altogether probably the finest exhibition of the kind we have had in this country. It is divided into five sections:—1. Naval architecture, including war vessels, sailing ships, paddle and screw steamers, yachts, dredges, and miscellaneous craft, boats and life-boats; (2) Marine engineering, including engines and parts of engines, boilers and boiler appliances, &c., governors; (3) Equipment, including anchors, boat-lowering apparatus, pumps and hydraulic machinery, steering-gear, telegraphs, windlasses, &c., machines and tools; (4) Navigation and harbour works; (5) Miscellaneous. The first section is of special interest, containing models of vessels of all ages and of all kinds, from

the *Henry Grace de Dieu* (A.D. 1514) down to the *Livadia*, many of these models having been lent by the Admiralty. Prefixed to the carefully compiled catalogue is a sketch of the rise and progress of steam navigation, more especially on the River Clyde, by Mr. W. J. Miller, C.E. The success of this exhibition is largely due to the energy and tact of the Curator of the Glasgow Industrial Museum, Mr. James Paton.

"THE Journal of the Indian Archipelago," founded and edited by the late J. R. Logan, which was published at Singapore, and ceased to appear some years since, has always been accepted by ethnologists as a valuable contribution to Malayan literature. Some of the early volumes, especially the first, have long been out of print, but Mr. David Logan, the son of the late editor, who was recently in England, has reprinted the scarce ones, thus enabling complete sets of the work to be obtained. Messrs. Trübner are, we believe, the agents in London.

THE very large and extensive entomological collection made by the late Jno. Miers, F.R.S., has been presented to the Ashmolean Museum at Oxford, and is now being studied and incorporated by Prof. Westwood. This collection is particularly rich in Brazilian insects, and thus becomes peculiarly valuable for the Oxford collection, which was, compared with other regions, poor in the neotropical fauna.

THE British Museum will shortly acquire the splendid collection of Heteromerous Coleoptera formed by Mr. Frederick Bates.

SOME unbelievers insisted that the submarine crannog described by Mr. Ussher at Ardmore, Co. Waterford, was only the remains of an old salmon weir; the late storms however seem to have set this theory at rest, as they have cut out the peat to seaward of the crannog and exposed the ancient kitchen midden, also additional piling not previously known.

AT the last meeting of the St. Petersburg Society of Naturalists Prof. Wagner exhibited the hydroids and medusæ of the White Sea he has brought home, giving a detailed description of ten species of medusæ he has discovered in that sea.

AT the last meeting of the St. Petersburg Horticultural Society M. Wolkenstein exhibited a new variety of vine which grows and fruits at Warsaw and Riga. M. Wolkenstein thinks it might fruit even at St. Petersburg. We notice also a communication by Prof. Regel on apples.

PROF. SILVANUS THOMPSON has an interesting article in the current number of *Brain* on "Optical Illusions of Motion."

WE learn from a paper published by M. Goulishambaroff in the *Journal* of the Russian Physical and Chemical Society, vol. xii. fasc. 5, that the whole of the naphtha region of the Apsheron Peninsula has an area of 4·3 square miles, which may be divided into two parts: that of Balakhany, which has given naphtha since the oldest times; and that of Sabountchi, which was explored only in 1873. The first part contains forty-seven naphtha-wells, of which only twenty-eight are productive, and yield together 6,192,000 lb. of naphtha daily. The density of this naphtha varies from 0·855 to 0·885, the average density being 0·8675; whilst the naphtha of the Sabountchi region has a density of from 0·820 to 0·860, and is extracted to an average quantity of 6,622,000 lb. The density varies from the most different causes: it varies in different wells, and usually it might be said that in the same bore the density diminishes with the depth; however, heavy naphtha is received also from very near to the surface; usually it becomes heavier when the evaporation of volatile gases is rendered easy by local circumstances. Contrary to established opinion, M. Goulishambaroff proves that the naphtha of the Apsheron Peninsula contains volatile products of a density of 0·62, but no use is made of them because of the imperfect means of purifying. The amount of photogene received varies very much, namely, from 15 to 85 per cent., the naphtha which has a density of 0·890 to 0·900 giving the lowest, and that of a density of 0·820 giving the highest, percentage; the most usual kinds of naphtha (density 0·863 to 0·870) usually give from 35 to 40 per cent. of photogene. It shows, he stated, however, that thorough measurements of the coefficient of dilatation of naphtha having not as yet been made, there remains a certain want of precision in the determinations of its specific weights.

ON the night of the 3rd inst. a magnificent display of aurora was seen from various parts of the country. We have received several communications on the subject. Mr. E. W. Prevost writes from Cirencester that the display was visible there from 6 p.m. up to about midnight. "The glow, which extended over an angle of about 100°, rose upwards to a height of 20°, leaving the central portion comparatively dark. Faint streamers occasionally showed themselves, reaching 35° in height. A shifting of the streamers from east to west was noticeable, the illuminated arc being at times extinguished on the eastern side, this extinction progressing slowly towards the centre of the arc, when the light would reappear at the eastern side. At no time, as far as I observed, did the light disappear on the western side; the colour was of a greenish-yellow and the wind due north." From Bootham, York, November 3, Mr. J. Edmund Clarke writes: "There is quite a brilliant aurora this evening, first noticed about 6.30 as a diffused light shifting from north-east to south-west, with occasional streamers. Now (7.30-8.45 p.m.) it forms a low bright arch of considerable intensity. I said 'first seen about 6.30,' but at 4.40 I called the attention of a friend to some sharply-defined red streamers in the north-east, which I then took to be sunlight. On August 12 last, about ½ to ¾ hour after sunset, my attention was called to streamers precisely similar, in every respect like those of the aurora. But careful observation showed that these were certainly radiating *from* the sun, and not converging *towards* the magnetic pole. It is certainly my impression that such was the case to-night, but being busy I did not take any special pains to ascertain. Of course this double coincidence may be a pure accident, but is it not possible that the minute substances reflecting the solar rays are actually modified by the electric field, so as to produce this remarkably distinct variety of rays? P.S.—8 p.m. Brilliant streamers from the bright arch, with some corruscations." Prof. Reilly, of the Royal College of Science for Ireland, writes that in Dublin the display was very fine. "The principal beam appeared as if slowly moving from west to east, and had a direction quite parallel to the pointers of the Great Bear. It reached at the time when seen quite up to the Polar Star. The lights were observed at earlier hours, one person having mentioned to me 6 o'clock p.m." In Orkney it showed itself as one of the most brilliant displays of aurora borealis seen for a long time. The whole northern horizon was one dark mass of clouds with a sharply-defined edge, and from these the aurora shot up in beautiful coloured streams to nearly the zenith, covering the clear sky above the clouds from north-east round to north-west. Occasionally the aurora took the form of a gigantic rainbow, and the light was as bright as moonlight.

A SMART shock of earthquake occurred on the 9th inst. throughout Southern Austria, from Vienna to the Adriatic and the frontiers of Bosnia. In the capital a rather violent shock was felt at a quarter to eight. Numerous telegrams have been received by the Meteorological Bureau at Vienna stating that shocks were felt at Serajevo, Derwenta, Brod, Pola, Trieste, Zilli, Klagenfurt, Fünfkirchen, Odenburg, Marburg, Laibach, and Gross-Kanischa. In Agram, the capital of Croatia, three shocks of earthquake occurred, a period of an hour intervening between the second

and third. One of them, which lasted ten seconds, was so powerful that not a single house remained uninjured. A general panic reigns in the town. Many of the inhabitants, including the Cardinal-Archbishop, have taken to flight. It is impossible to estimate the whole extent of the damage. The number of persons injured is at present estimated at thirty.

THE eruption of Vesuvius continues to increase in activity. Two large streams of lava are at present (November 8) flowing from the crater to the base of the cone.

IN Prof. Huxley's article on the *Challenger* Publications last week, line 11 from top of p. 2, col. 2, should read "*direct* and but little modified descendants," instead of "*dried*," &c.

OUR ASTRONOMICAL COLUMN

HARTWIG'S COMET (1880 *d*).—In a circular issued by Prof. Winnecke from the Observatory of Strasburg on the 1st inst., he gives reasons for assuming that the comet detected by Dr. Hartwig on September 29 may have a much shorter period than was conjectured in his first circular. On calculating parabolic elements from the Strasburg observations of September 29 and October 8, and one by Prof. Auwers at Berlin on October 17, MM. Ambronn and Wislicenus, students in the University of Strasburg, found the middle observation could not be more closely represented than with an error of something over two minutes of arc. Prof. Winnecke, as was stated in our previous notice, considered he had reason for suspecting the identity of Hartwig's comet with that of 1506, and a further examination of the historical descriptions has led him to direct attention to the comets of 1382, 1444, and 1569, and with the perihelion passage fixed to July 13, 1444, and October 15, 1569, he finds geocentric positions which he regards as in sufficient agreement with the records. A period of revolution of about 62⅓ years is therefore obtained, and an ellipse with this period has been adapted by Dr. Schur and Dr. Hartwig to the observations on September 29 and October 14 and 24. The resulting elements are as follow :—

Perihelion Passage, 1880, September 6·58949 M.T. at Berlin.

Longitude of perihelion	83 33 28	M. Eq. 1880·0.
,, ascending node ...	44 33 30	
Inclination	38 8 56	
Log. excentricity	9·990180	
Log. semi-axis major	1·196457	
Log. mean diurnal motion	1·755321	

The error of the place deduced from this ellipse on October 14 is + 28″ in longitude and the same in latitude, and it is remarked that the error in longitude does not admit of being destroyed without an increase of error in latitude. This, however, Prof. Winnecke suggests, may arise from the assumed period of 62⅓ years being really a multiple of the true one. The comet approaches near to the orbit of Mercury at the ascending node, though at the present time not sufficiently close to occasion any change in the character of the orbit. Still at some past epoch the effect of perturbation may have brought the orbits into coincidence or nearly so, and Prof. Winnecke hints that the planet Mercury might have been the means of impressing an elliptical form on the comet's orbit.

It is clearly a case in which those observers who are in the possession of very powerful instruments may render most material service towards deciding whether we have to do with a comet of comparatively short period. If it is practicable to secure good observations for position after the next period of moonlight, it may then be possible to obtain evidence *pro* or *con*, by direct computation of the orbit, though unfortunately observations did not commence until the comet had reached the extremity of the parameter, or in other words had attained an angular distance of 90° past the perihelion point.

DISCOVERY OF A COMET.—Lord Lindsay notifies the discovery of a comet at his observatory, Dunecht, during the night of the 7th inst., by Mr. Lohse in the constellation Lacerta ; the position at 15h. 30m. in R.A. 22h. 45m. 54s., Declination 42° 33′·7 ; daily motion in R.A. + 6m. 58s., in Decl. + 1° 8′. This is far from any position which the expected comet of 1812 could occupy on the above date.

CERASKI'S VARIABLE STAR.—Mr. Knott obtained a very complete observation of the descending and ascending light-curve of this newly-detected variable on November 2 ; the minimum appears to have occurred about 11h. G.M.T. The period will be somewhat less than 2½ days.

PHYSICAL NOTES

PROF. LORENZ has given in *Wied. Ann.*, No. 9, a development of his theory of "refraction-constants" (published before in Danish), and described experiments bearing on it. The problem contemplated was to find that function of the refractive index, freed from dispersion, and of the density of a body, which is constant with varying density of the body, supposing the molecules themselves unchanged. It is assumed that bodies consist of molecules in whose intervals light is propagated with the same velocity as in vacuous space ; further, that the bodies are isotropic, and their molecules of spherical form. Herr Lorenz arrives at a simple expression for the refraction-constant, the constancy of which, as also the correctness of the assumption as to light moving with the same velocity in the intervals of molecules as in vacuo, had to be proved. He determined the refraction constants of several bodies in the liquid and the vaporous states, viz., ethylic ether, ethylic alcohol, water, chloroform, ethylic iodide, ethylic acetate, and sulphide of carbon. The refraction was determined with sodium and lithium light, and at temperatures of 10°, 20°, and 100°. He found that in passage of the substances from the liquid to the vaporous state the refraction-constant varies very little (only about 5 per cent. at most). Dispersion also showed great constancy. Another Danish physicist, K. Prytz, has extended the inquiry to some ten other substances (*loc. cit.*), and confirmed the assumption of refraction constants.

WITH regard to electricity, Herr Hoorweg (*Wied. Ann.*, No. 9) divides all bodies into two groups, (*a*) those in which the conductivity rises with the temperature (dielectrics), and (*b*) those in which it decreases with rise of temperature (adielectrics). He endeavours to prove by experiment (1) that both dielectric bodies with adielectric, and adelectric with each other, yield contact electricity ; (2) that this electricity has always the same sign as that which arises with gentle friction or pressure. (The sometimes different action of strong friction is ascribed to the influence of the raising of temperature.) Not only does electricity arise through the different heat-motion at the places of contact of two heterogeneous substances, but this cause is fully sufficient to explain all development of electricity.

HERR NARR has lately obtained some interesting results in experimenting further on the behaviour of electricity in gases, and especially *in vacuo* (*Wied. Ann.*, No. 9). In the middle of a hollow brass sphere on a glass support was suspended a metallic ball by means of a platinum wire passing (insulated) through a metallic stopper to an electrometer. Vacua could be produced in the sphere. A charge of electricity imparted to the conducting system underwent the same process of dispersion *in vacuo* as where the space was full of gas. The outer surface of the hollow sphere, one minute and also one hour after the charging, had the same electricity as the conducting system. Herr Narr further finds that the process of dispersion in gas-filled space is not perceptibly influenced by the hollow sphere being insulated or being connected to earth, if the original charging be done while the sphere is connected to earth ; the dispersion constant diminishes in both cases, at least at the beginning. But if the conducting system be charged while the hollow sphere is insulated, the latter has in this state one minute, and likewise one hour to one hour and a half after, electricity of the same sign with the conducting system, and the first connection of the hollow sphere to earth occasions a temporary outflow. Herr Narr shows reasons for believing that the electricity on the hollow sphere finds its way through the gas-space.

A NEW series of experiments of extended range, by Herr Roth, on the compressibility of gases, is described in *Wied. Ann.*, No. 9. The relations between pressure, volume, and temperature, in the case of carbonic acid, sulphuric acid, ammonia, and ethylene, are studied. The results are mainly confirmatory of van der Waal's formulæ.

A NEW balance designed to be easily transportable, light, and yet stable, without fixing to the table, and to serve in inspection of widely various weights (by Government officials in Hungary), was lately brought before the Buda-Pesth Academy by Herr von Krasper (see *Wied. Beibl.* No. 9, p. 638). Among other features,